# HUMAN HEALTH PROBLEMS ASSOCIATED WITH MEVINPHOS (PHOSDRIN) IN CALIFORNIA DURING 1978

By

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## SUMMARY

In 1978, there were 39 exposures to mevinphos (Phosdrin) reported by physicians to the California Department of Food and Agriculture. Of these exposures, 37 were suspected systemic illnesses, 1 was an eye exposure incident, and 1 was a skin-and-eye irritation. Most exposures resulted from failure to comply with label restrictions and established regulations. There were some cases, though, in which all label restrictions and regulations were followed, and excessive exposure still occurred. Only a few cases were the result of mechanical failure. In the 4-year period from 1975 to 1978, there were 219 occupational exposures to Phosdrin with resulting illnesses that were reported in California by physicians. Phosdrin is one of the most hazardous pesticides currently registered. Pest management guides now being developed will recommend that it only be used as a last resort chemical; only when suitable safer alternates are not available.

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## CASE STUDIES

In 1978, there were 39 exposures to Phosdrin reported to the Department of Food and Agriculture by physicians in California. Of these incidents, 1 involved a skin-and-eye irritation, 1 was an eye exposure incident, and 37 were suspected systemic illnesses. The following is an account of each exposure incident.

### Suspected Systemic Illnesses

Of the 37 suspected systemic illnesses, 18 involved mixers and loaders of Phosdrin.

A mixer and loader for an aerial application had been working with Phosdrin for approximately 4 hours when he began to feel ill. He was using a closed system and wearing all of the required safety equipment at the time. He was admitted to the hospital for 2 days and then told to work at a low-pesticide exposure job for 3 weeks.

A mixer and loader for an aerial application had been working with Phosdrin for 4 hours, and with Lannate, toxaphene, and Dipel a few days earlier. He became ill at home, and went to the hospital where he was treated for possible pesticide poisoning with atropine and protopam.

After mixing and loading a variety of chemicals during the day, a worker began to feel dizzy, and vomited. He was using a closed system, wearing all the required safety equipment, and did not recall spilling any material on himself. He was hospitalized for 2 days and was off work for 4 days. His condition was diagnosed as possible organophosphate poisoning since he had been working with Phosdrin, Thimet, diazinon and Lannate.

Three employees of an aerial application company became ill with symptoms of nausea, weakness, and blurred vision after working with a closed mixing and loading system on different occasions. One man was hospitalized for 2 days and another for an unspecified amount of time. Exposure probably resulted from Phosdrin fumes or spray caused by high temperatures which escaped while a lid was off the tank. Two of the 3 men were not wearing respirators at the time.

After loading a variety of chemicals (Phosdrin, Lannate, parathion, and methyl parathion), a worker exhibited signs of weakness, dizziness, excessive sweating, and vomiting. He was taken to a doctor and treated with atropine. He was then admitted to a hospital for treatment for organophosphate poisoning.

As a helicopter loaded with Phosdrin and Nudrin took off, several leaking nozzles sprayed an employee. Several hours later, he began to feel nauseated. Vomiting and profuse sweating developed. He was taken to a hospital, given atropine and protopam for organophosphate poisoning, and released after 2 days.

While mixing Phosdrin, a worker dropped a rubber mallet inside a mix tank. He took off his rubber glove and retrieved the tool, submerging his hand completely in the Phosdrin mix. Later, while flagging, spray drifted onto him. He experienced nausea and abdominal cramps, and was admitted to the hospital for treatment with low cholinesterase levels.

A worker began to feel strange while flagging for a plane spraying Phosdrin. Later, while mixing, some of the solution splashed on him. He began feeling nauseated, and his vision became blurry. He was treated with atropine at a hospital emergency room.

A mixer and loader for aerial applications had been working with carbamates and organophosphates, which included Phosdrin, for 11 days before he became ill. A closed system was used, and gloves and overalls were worn. He was treated with atropine and told not to work with those types of chemicals until his cholinesterase levels returned to normal.

While opening a container of concentrated Phosdrin, some of the material squirted on a worker's face. His symptoms included a fluttering in his throat, fine tremors, and sweating. The doctor advised him to avoid exposure to all pesticides for at least 1 week.

An employee was preparing a mixture of Phosdrin without wearing any safety equipment. He opened a container and then moved it to another spot. As he set it down, some of the solution splashed onto his face and arms. He experienced nausea and dizziness, and was treated with atropine for organophosphate poisoning.

While working with a closed mixing-and-loading system, a ground applicator contaminated his shoulder with Phosdrin. He washed and went to a physician. He had blood tests taken and was treated. His doctor advised him not to work with any organophosphates until his cholinesterase levels returned to normal.

While mixing and loading a solution of Phosdrin, a worker was sprayed in the face, arms, and hands when a hose blew off of the equipment. He washed immediately, and was admitted to the hospital with symptoms of headache and vomiting. He remained for 5 days, during which time he was continuously treated with atropine. He began working again at a low-exposure job until his cholinesterase level returned to normal.

Because the closed-system rig was not functioning, a worker hand-poured Phosdrin into the tank of another rig. As he reached up to pour it, some of the solution spilled onto his head. He immediately washed, changed clothes, and attempted to work again. He began shaking and feeling weak; his eyelids began to swell, and he then became unconscious. He was admitted to a hospital where he was kept for 4 days and then ordered to stay off work for 3 months. He was told by the medical examiner that his failure to seek prompt medical attention could have been fatal if he had delayed going to the hospital for 1/2 hour longer.

While either mixing, loading, or flagging, a worker was exposed to Phosdrin. He became ill and attempted to drive home, but became unconscious before he got there. He was admitted to a hospital for 1 day and given large doses of atropine. It was not specified how long he was off work after the incident.

A worker had been mixing and loading Phosdrin and Nudrin. As he emptied a water-soluble bag of Nudrin into the mix tank, some of the dust escaped and was inhaled, although a respirator was worn. He was treated with atropine for pesticide poisoning, and kept overnight at the hospital.

A worker was mixing Phosdrin and Dipel for an aerial application. While trying to break a lump of material, some of the solution splashed into his eye. He washed immediately and continued working. He later complained of blurred vision and was taken to a hospital where he was given atropine for organophosphate poisoning.

A flagger was working in a lettuce field being sprayed with Phosdrin. He remembered the wind shifting and having some contact with the drift. He left work feeling slightly ill and went to the hospital when he began to get worse. Cholinesterase tests were made, and he was given atropine for organophosphate poisoning. He was off work for 3 days.

While flagging for a plane spraying Phosdrin, a worker began to feel dizzy. He was taken to a physician exhibiting symptoms of organophosphate poisoning. He lost no days of work.

A flagger had been working with Phosdrin for about 10 hours. He began experiencing nausea and weakness, was taken to a doctor, and was treated with atropine. He was off work for 3 weeks until his cholinesterase level returned to normal.

A flagger who had been working with Phosdrin for 2 days began to complain of nausea, fatigue, and headaches. Three days later, he was taken to a hospital where tests showed abnormally low cholinesterase levels. He was hospitalized for 2 days.

A formulator was working with Phosdrin in the morning and, later, loading containers of Phosdrin and Systox. He took off his respirator a number of times during the day. He began experiencing nausea, stomach cramps, and excessive sweating and salivation, which may have resulted from breathing pesticide mist or dust. He was hositalized for 1 day where he was treated with atropine.

While mixing Phosdrin, a formulator developed a headache and became nauseated. He was taken to a physician who administered atropine. He was told not to return to work for 4 days and then only to a low-pesticide exposure area for another 4 days.

A worker in a formulating plant splashed Phosdrin into his eyes. A cholinesterase test was administered, and his cholinesterase levels were found to be within normal limits.

While pouring Phosdrin from one container to another, a warehouse worker spilled some of the solution on his body, and he breathed in some of the fumes. No respirator was worn. He experienced dizziness, blurred vision, and diarrhea, and was treated by a physician.

A warehouse worker was removing empty Phosdrin bags from a storage area on a windy day. He had his coveralls unzipped to the waist and some of the dust blew on him. Two days later, he developed symptoms of nausea and a fine papular rash on his chest and arms. A cholinesterase test revealed a possible case of organophosphate poisoning, which was treated with atropine. The rash was probably due to another chemical which was also in the area at the time.

While going into the field, a worker was sprayed with Phosdrin by an aerial applicator. He was admitted to the hospital for 1 day with complaints of headache, blurred vision, and nausea. He was given atropine for organophosphate poisoning and told to stay off work for 2 days.

A mechanic was fixing a pump which was near a mix tank containing a mixture of Phosdrin, Thimet, and Paraquat. After working on the pump, he felt dizzy and weak, and had a headache and blurred vision. His illness was first diagnosed as the flu, and 3 days later as high blood pressure with possible pesticide poisoning based on low cholinesterase levels. He was advised to rest for 3-4 four weeks and avoid any contact with pesticides.

A swamper was working with Phosdrin when some of it splashed into both eyes. He was treated that day by a physician. Approximately 6 weeks later, the worker returned, complaining of headaches and blurred vision. A complete eye examination showed no problems. The physician stated that, from the information available, he was uncertain if the eye problems were related to the initial Phosdrin exposure.

A ground applicator was exposed to Phosdrin while working. The Doctor's First Report of Occupational Illness did not state the circumstances. A closed system was used, and all safety equipment was worn. He was hospitalized for 2 days, treated with atropine, and then advised to stay off work for 1 week.

While spraying his orchard with Phosdrin, a farmer became ill. He experienced profusive perspiration, chills, dizziness, blurred vision, and nausea. No safety equipment was worn. He was hospitalized for an unspecified period of time and treated with atropine and protopam.

While operating a spray rig during an application of Phosdrin, a driver began exhibiting symptoms of blurred vision, weakness, and nausea. He was taken to the hospital and examined, but no treatment was given. The doctor advised that the worker should seek employment where he would not be exposed to pesticides.

A group of people were near fields which were being sprayed with a variety of chemicals including Phosdrin. Apparently some of the spray drifted over the party. Approximately 20 minutes later, 1 man began to feel dizzy, and vomited. Two days later, he went to the doctor and was given pills for nausea and had x-rays taken which were normal. There was no positive evidence of pesticide poisoning at this later time.

Two employees were next to a field which was being sprayed with Phosdrin. They were both exposed to drift. They washed, changed clothes, and went to the hospital for cholinesterase tests. One employee returned for a check up, but neither employee exhibited symptoms characteristic of organophosphate poisoning.

Eye Exposure Incidents

A formulator was working with Phosdrin when some of the solution splashed into his eye. He developed a twitch which persisted for 10 days and got

progressively worse. He was not wearing goggles because, he said, they fogged up and he could not see.

Skin and Eye Incidents

While unloading boxes from a truck, a worker noticed that something had spilled. About an hour later, his arms and eyes began to "burn." He was sent to a hospital emergency room as a precautionary measure when it was determined the spilled substance was Phosdrin. No further information was available.

## DISCUSSION

Phosdrin continues to be the most difficult pesticide to work with safely of all the pesticides registered for use in California. There were no fatalities but there were several near fatalities. Spills of only a few drops on the skin can result in very serious poisoning.

It is recommended that commissioners carefully evaluate who receives and who retains a Phosdrin permit.

The pest management guides being developed by the Department will recommend that in the future Phosdrin only be used as a last resort pesticide when substitute pesticides are inadequate and ineffective.

TABLE 1

ILLNESSES DUE TO PHOSDRIN EXPOSURE
REPORTED BY TYPE OF ILLNESS AND JOB CATEGORY
FOR 1975, 1976, 1977, AND 1978 IN CALIFORNIA

| | 1975 | 1976 | 1977 | 1978 | Total |
|---|---|---|---|---|---|
| Suspected Systemic Illnesses | 62 | 58 | 48 | 37 | 205 |
| Mixer/Loader | 23 | 22 | 32 | 18 | 95 |
| Manufacturing/Formulating | 19 | 8 | 1 | 3 | 31 |
| Ground Applicator | 13 | 12 | 6 | 2 | 33 |
| Flagger | 2 | 4 | 2 | 4 | 12 |
| Field Worker | 0 | 4 | 0 | 1 | 5 |
| Aerial Applicator | 0 | 1 | 1 | 0 | 2 |
| Worker Exposed to Drift | 1 | 1 | 0 | 1 | 3 |
| Truck Loader/Warehouse | 1 | 0 | 2 | 2 | 5 |
| Cleaner/Repairer | 1 | 1 | 3 | 1 | 6 |
| Indoor Worker | 0 | 1 | 0 | 0 | 1 |
| Other | 1 | 2 | 1 | 3 | 7 |
| Exposed, Not Ill | 1 | 0 | 0 | 2 | 3 |
| Unconfirmed | 0 | 2 | 0 | 0 | 2 |
| Skin Exposure Incidents | 2 | 6 | 1 | 0 | 9 |
| Irrigator | 1 | 0 | 0 | 0 | 1 |
| Field Worker | 1 | 3 | 1 | 0 | 5 |
| Mixer/Loader | 0 | 1 | 0 | 0 | 1 |
| Manufacturing/Formulating | 0 | 1 | 0 | 0 | 1 |
| Exposed, Not Ill | 0 | 1 | 0 | 0 | 1 |
| Eye Exposure Incidents | 2 | 3 | 0 | 1 | 6 |
| Cleaner/Repairman | 1 | 0 | 0 | 0 | 1 |
| Field Worker | 1 | 1 | 0 | 0 | 2 |
| Mixer/Loader | 0 | 2 | 0 | 0 | 2 |
| Manufacturing/Formulating | 0 | 0 | 0 | 1 | 1 |
| Skin and Eye Incidents | 0 | 0 | 0 | 1 | 1 |
| Manufacturing/Formulating | 0 | 0 | 0 | 1 | 1 |
| Total Illnesses to Phosdrin Exposure | 66 | 67 | 49 | 39 | 221 |

TABLE 2

ILLNESSES DUE TO PHOSDRIN EXPOSURE REPORTED
BY DAYS OF HOSPITALIZATION AND DISABILITY FOR
1975, 1976, 1977, AND 1978 IN CALIFORNIA*

| Hospitalization | 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|---|
| 1 day | 4 | 4 | 5 | 5 |
| 2 days | 12 | 8 | 1 | 6 |
| 3 days | 5 | 3 | 5 | 1 |
| 4-5 days | 3 | 2 | 0 | 2 |
| 6 days | 0 | 0 | 1 | 0 |
| Unspecified | 4 | 2 | 3 | 3 |
| **Period of Disability**** | | | | |
| None | 12 | 10 | 5 | 9 |
| 1 day | 3 | 5 | 3 | 0 |
| 2 days | 9 | 9 | 3 | 2 |
| 3-4 days | 13 | 6 | 6 | 2 |
| 5-7 days | 5 | 6 | 7 | 3 |
| 8-14 days | 7 | 3 | 5 | 1 |
| 3-4 weeks | 2 | 3 | 4 | 5 |
| More Than 4 Weeks | 0 | 3 | 0 | 1 |
| Unspecified | 15 | 22 | 19 | 16 |

*Days of disability are usually those reported by physicians as the estimated period of disability during the employee's initial examination. Previous experience indicates that this estimated period is often understated.

**Period of disability is the estimated period of time that the worker is off work, and it includes the days hospitalized.

TABLE 3

ILLNESSES DUE TO PHOSDRIN EXPOSURE REPORTED BY
TOTAL ESTIMATED DAYS OF HOSPITALIZATION AND
DISABILITY FOR 1975, 1976, 1977, AND 1978 IN CALIFORNIA

Total Estimated Days of Hospitalization

| 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|
| 69 | 44 | 37 | 38 |

Total Estimated Days of Disability

| 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|
| 433 | 579 | 491 | 422 |

TABLE 4

ILLNESSES DUE TO PHOSDRIN EXPOSURE REPORTED BY MONTH OF OCCURRENCE FOR 1975, 1976, 1977, AND 1978 IN CALIFORNIA

| Month | 1975 | 1976 | 1977 | 1978 | Total |
|---|---|---|---|---|---|
| January | 1 | 1 | 3 | 1 | 6 |
| February | 2 | 5 | 0 | 2 | 9 |
| March | 2 | 6 | 4 | 1 | 13 |
| April | 10 | 4 | 6 | 2 | 22 |
| May | 12 | 3 | 2 | 2 | 19 |
| June | 4 | 4 | 4 | 5 | 17 |
| July | 3 | 13 | 5 | 15 | 36 |
| August | 10 | 8 | 8 | 4 | 30 |
| September | 9 | 11 | 5 | 4 | 29 |
| October | 7 | 3 | 9 | 3 | 22 |
| November | 5 | 8 | 3 | 0 | 16 |
| December | 1 | 1 | 0 | 0 | 2 |
| Total | 66 | 67 | 49 | 39 | 221 |

TABLE 5

ILLNESSES DUE TO EXPOSURES TO PHOSDRIN
AS REPORTED BY COUNTY OF OCCURRENCE
FOR 1975, 1976, 1977, AND 1978 IN CALIFORNIA

| County | 1975 | 1976 | 1977 | 1978 | Total |
|---|---|---|---|---|---|
| Alameda | 0 | 0 | 1 | 0 | 1 |
| Fresno | 16 | 7 | 2 | 5 | 30 |
| Imperial | 12 | 8 | 8 | 5 | 33 |
| Kern | 5 | 12 | 3 | 9 | 29 |
| Kings | 2 | 2 | 1 | 0 | 5 |
| Los Angeles | 3 | 3 | 2 | 0 | 8 |
| Madera | 0 | 1 | 0 | 0 | 1 |
| Merced | 3 | 1 | 8 | 1 | 13 |
| Monterey | 2 | 9 | 8 | 8 | 27 |
| Orange | 0 | 3 | 3 | 0 | 6 |
| Riverside | 8 | 3 | 5 | 0 | 16 |
| San Benito | 1 | 1 | 1 | 0 | 3 |
| San Bernardino | 0 | 0 | 1 | 0 | 1 |
| San Joaquin | 1 | 1 | 0 | 1 | 3 |
| San Luis Obispo | 0 | 1 | 0 | 1 | 2 |
| Santa Barbara | 2 | 3 | 1 | 0 | 6 |
| Santa Clara | 3 | 0 | 0 | 0 | 3 |
| Santa Cruz | 4 | 7 | 1 | 4 | 16 |
| Tulare | 0 | 2 | 0 | 6 | 8 |
| Ventura | 4 | 1 | 1 | 0 | 6 |
| Yolo | 0 | 2 | 2 | 0 | 4 |
| Total | 66 | 67 | 49 | 39 | 221 |